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## Would satisfaction with smart speakers transfer into loyalty towards the smart speaker provider?

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# **Would satisfaction with smart speakers transfer into loyalty towards the smart speaker provider?☆**

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Voice-enabled smart devices are poised to become the next new thing as it provides convenience in fulfilling users' instant needs. The ability to provide information, control home systems, and manage daily schedules has made smart speakers become the new gateway to users' personal spaces. The current smart speaker market however is dominated by IT or media firms instead of traditional audio manufacturers. By using its strong user base and existing array of services, smart speakers are perceived as a new opportunity to lock-in users to the service provider's platform. This study examines the extent to which consumer satisfaction with the smart speaker influences continuous usage intentions and most importantly, loyalty toward the smart speaker provider. Satisfaction is measured based on the system and information quality of the smart speaker. The empirical findings are drawn from 326 smart speaker users in Korea. The study finds that user satisfaction is an important asset that influences users' future intentions in using the smart speaker and remaining loyal to the service provider. As the smart speaker market becomes competitive, the race to lock-in users can be made through comprehensive approaches to developing the information and system quality of smart speakers.

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## 1. Introduction

Smart speakers are touted as the next big thing after the smart phones. Simply defined as Wi-fi connected speakers with voice-activated systems, it is also referred to as voice-activated speakers or artificial intelligent(AI) speakers. Through a trigger keyword that activates the speaker, users can easily acquire various information and services that fulfill their instant needs. Smart speakers may seem like a sudden innovation, but it roots back to Apple's launch of Siri in 2011 (Pestanes & Gautier, 2017). Through a gradual process of people familiarizing with voice assistants, the diffusion of smart speakers can be interpreted as an anticipated expansion of mobile-based intelligent personal assistants to users' homes and private spaces (Cherian & Pounder, 2017; Maggio, 2018).

The interesting trend in the smart speaker market is that smart speakers are not produced by traditional audio manufacturers. Instead, the market is dominated by IT and media firms that already have existing services and products. For example, nine out of every ten products belong to Amazon Echo and Google Home. While there are traditional audio related firms like Sonos, most new entrants are IT firms like Apple and Facebook. This market landscape is also seen in Asia. In China, the smart speaker market is dominated by e-commerce and IT companies like JD.com, Alibaba, and Baidu. Even in growing markets like Korea, smart speakers are also produced by local network operators and media companies that already have existing services and products. Means to develop this technological innovation may vary but the motivation is clear: to enhance user attachment toward the service provider. For existing service providers, smart speaker is a new potential to deliver integrative services and enhance user attachment to the service provider. The competition in the smart speaker market has thus become severely intense as each service provider seeks to lock-in users and become the dominant service provider.

Despite this recent trend, there is limited research on smart speakers and consumer perceptions toward the new device provided by existing IT and media firms. Existing studies on consumer behavior focus on how service satisfaction leads to consumer loyalty (e.g., Caruana, 2000; Cronin, Brady, & Hult, 2000; Hwang & Kim, 2017). In addition, ways to examine satisfaction through service quality is also illustrated in various marketing and information management related studies (e.g., DeLone & McLean, 1992; Wolfinbarger & Gilly, 2003; Zeithaml, Berry, Parasuraman, 1988). In terms of smart speakers, most are technology related research or focus on the use of voice-intelligent systems (e.g., Diao, Liu, Zhou, & Zhang, 2014; Medicherla & Sekmen, 2007). Despite the extensive coverage in media, there is

insufficient literature on smart speakers launched specifically by IT and media firms. This study therefore seeks to understand how satisfaction with smart speakers influences users' smart speaker continuance usage intention and loyalty toward the service provider. In addition, service quality is also examined to find the antecedents that contribute to user satisfaction and actual smart speaker usage. As one of the first to examine consumers' perceptions toward smart speakers provided by IT and media firms, this study hopes to offer meaningful contributions to both academia and related industries.

## **2. Literature Review**

### **2.1. Smart speaker service providers**

Smart speakers first appeared in the consumer market after Amazon released Amazon Echo in 2014. Smart speakers received significant attention by attaching voice recognition and artificial intelligence to the audio device. The ease of fulfilling one's instant needs through hands-free, voice activated systems attracted many users to welcome smart speakers into their lifestyles and private spaces. Smart speakers may seem like a sudden innovation from Amazon and Google, but the integration of Siri into Apple's iPhone is perceived as the origin of voice intelligent personal assistants. With more than 375 million users familiar with using the voice-activated systems on one's mobile phones, the adoption of smart speakers into their homes, workplaces, and vehicles seems to be an anticipated expansion of voice recognition and artificial intelligence systems (Maggio, 2018).

The smart speaker is prospected to be the new potential to engage and attach users to the service provider. With various existing services delivered by smart speaker service providers, smart speaker users are anticipated to relish integrative services that are customized to users' preferences. For example, Google Home users may access their email and daily schedules, search for music clips on YouTube, and browse on the search engine using their Google account. As smart speakers gain access to managing users' home devices, the potential of smart speakers is immeasurable. This expectation is portrayed in the market value of smart speakers. The global smart speaker market is valued at \$2.68 billion in 2018 and is expected to reach a worth of \$11.79 billion in 2023, growing at a CAGR of 34.44% between 2018 and 2023. The market is expected to grow rapidly as more users take advantage of the convenience that the smart speaker provides. Reports claim that the rise of disposable income, increase in smart homes, and growing demand for personalization will also contribute to the growth of smart speakers

(Business Wire, 2018, Wueest, 2017). In light of this growth potential, this study seeks to understand how consumer satisfaction with smart speakers lead to loyalty toward the service provider.

## **2.2. Consumer Loyalty and Continuous Usage Intention**

Consumer loyalty is an important concept that helps determine consumer behaviors and attitudes. Oliver (1997) defines loyalty as consumer's commitment to constantly rebuy or repatronize a product or service in the future. Loyal users are anticipated to repetitively repurchase from the same brand despite situational influences or low switching costs to change. Oliver (1999) claims that loyalty is gradually built on four phases. First, consumers are believed to develop loyalty based on previous knowledge (cognitive) or information of the brand. Cognitive loyalty is the weakest form of loyalty as consumers are attached only based on monetary or functional incentives. Next, positive experiences with the brand are expected to create "liking" attitudes which lead to affective loyalty. Increased accumulation of positive experiences is anticipated to create conative loyalty which is expressed through greater motivations to rebuy the brand. Consumers in the conative stage are believed to show deeply held brand-specific commitments through repurchase and reuse of the brand. The last stage is action loyalty where high intentions to repurchase are performed in action. Oliver (1999) claims that the last phase of loyalty leads to action inertia.

The multidimensionality of loyalty leads to various ways of measurement based on the appropriate context. The general stream of brand loyalty literature measures loyalty based on attitude and behavioral perspectives (Dick & Basu, 1994). In some studies, the concept of loyalty is measured on cognitive, conative, and attitudinal levels (Vera & Trujillo, 2017; Yuksel, Yuksel, Bilim, 2010). Studies that focus on service loyalty specifically focus on consumer's future behavioral intentions. Zeithaml, Berry, and Parasuraman (1996) measure the impact of service quality through intentions to recommend and repurchase. De Ruyter, Wetzels, and Bloemer (1997) focus on behavioral loyalty towards the service rather than the brand by measuring consumer's future purchase intentions.

This study focuses on smart speaker users that already have experience in using various services offered by the smart speaker provider. Even though users are new to the smart device, they are assumed to have positive beliefs and familiarity with the brand and its services. Previous literature posits that user satisfaction, service quality, and positive experiences add up

to motivate users to “stick” onto the platform (Caruana, 2004; Li, Browne, & Wetherbe, 2006). Blut, Evanschitzky, Vogel, and Ahlert (2007) verify that satisfaction toward the service leads to conative and action loyalty. Oliver, Rust, and Varki (1997) claim that satisfaction predicts future intentions of attendance and supports the relationship between satisfaction and conative loyalty. Trail, Anderson, and Fink (2005) also verify this relationship in the context of loyalty in sports. The accumulation of positive experiences is anticipated to deepen attachment to the service provider and trigger consumers’ conative loyalty (Zeithaml et al., 1996). This study will therefore focus on the conative stage of loyalty that measures users’ brand-specific commitment to repurchase and ultimately remain attached to the platform.

Previous studies claim that continuous usage intention is an outcome of users’ satisfaction with the service or product. Oghuma, Libaque-Saenz, Wong, and Chang (2016) imply that perceived service quality and perceived usability influence user satisfaction and intention to continuously use the mM (mobile instant messaging) service. Zeithaml et al. (1996) assert that positive evaluations of service quality lead users to stay loyal by spending more time with the company and paying premium prices for services. In line with previous research that appoints continuous usage intention as a representation of positive evaluation and attitude toward the service provider, this study will perceive user’s intentions to continuously use the service as a symbol of attitudinal loyalty toward the service provider (Blut et al., 2007; Oliver et al., 1997). Therefore, users with positive intentions to continuously use the service is anticipated to have high motivations to show commitment in reusing and remaining loyal to the service provider.

**H1. Consumer’s continued usage of smart speakers will positively affect their conative loyalty toward the smart speaker provider.**

### **2.3. Consumer Satisfaction and Continuous Usage Intention**

Customer satisfaction is defined as the pleasurable fulfillment of one’s needs, desires, or goals. Consumers that have certain expectations toward products or services are anticipated to sense satisfaction when the outcome of a consumption exceeds their expectations. Satisfaction may occur from a specific transaction or from an accumulation of all previous transaction-specific activities. Oliver (1999) however claims that satisfaction should be measured at the cumulative level to understand its impact on loyalty. In this study, smart speaker satisfaction is perceived as users’ favorable and positive reaction toward the cumulative experience of using

smart speakers.

The significant relationship between satisfaction and loyalty has been demonstrated in many studies. Caruana (2004) finds that user satisfaction with Malta's retail banking positively influences consumer's intentions to reuse and depend on the service without switching to other service providers. Cronin et al. (2000) substantiate the relationship between consumer satisfaction and loyalty by illustrating how satisfied users have high intentions to repurchase and remain loyal to the service provider in six (spectator sports, participation sports, health care, entertainment, long distance carriers, and fast food) industries. Drawing on this close relationship between satisfaction and continuous usage intention, users that are satisfied with the smart speaker are expected to have positive intentions in continuously using the smart speaker service.

**H2. Consumer's smart speaker satisfaction will positively affect user's continuous smart speaker usage intention.**

#### **2.4. Consumer Satisfaction and Loyalty**

Literature on satisfaction and loyalty show that satisfaction with a service can transfer to satisfaction with or loyalty toward different services offered by the service provider. Rafiq and Fulford (2005) finds that satisfaction and loyalty toward offline grocery stores motivate users to transfer their loyalty to the online context. Song, Zhang, Chen, and Huang (2009) find that perceived entitativity of two services strongly influence Chinese users to transfer their loyalty from the instant messenger, QQ, to its portal QQ.com. Gefen (2000) even finds that familiarity with the service provider (Amazon.com) leads users to trust and increase intentions to inquire and purchase products from the site. However, Hwang and Kim (2017) posit that satisfaction with mIM services does not directly transfer to loyalty towards the service provider's online-to-offline (O2O) services. Based on previous studies, this study seeks to understand whether satisfaction with smart speakers positively influence users' intentions to remain loyal to the service provider. Lemon, White, and Winer (2002) claim that users consider not only current and past evaluations of the service, but also the future potentials of the service to determine their level of loyalty. Based on positive experiences and the future potential of smart speakers, this study will hypothesize that satisfaction with smart speakers will positively influence users to remain attached to the smart speaker provider.

**H3. Consumer's satisfaction with the smart speaker will positively affect their conative loyalty toward the smart speaker provider.**

## **2.5. Service Usage and Consumer Satisfaction**

The success of information systems is known to be determined by the extent of service usage and user satisfaction (DeLone & McLean, 1992). Studies on data warehouse software evaluations show that quality, satisfaction, and usage are important antecedents to determining the success of information systems management (Nelson, Todd, & Wixom, 2005). The correlation between satisfaction and usage however remains an issue as it is difficult to determine whether user satisfaction predicts usage or usage predicts user satisfaction. Wixom and Todd (2005) clarify this ambiguity based on the theory of expectancy-value theory, which claims that behavioral intentions to use a service is influenced by positive attitudes toward performing the behavior. Based on how satisfaction is defined as a positive attitude toward the outcome, the accumulation of these satisfactory attitudes is anticipated to influence users' behavioral intentions to use the service. This correlation is found in Guimaraes and Igarria's (1997) study which finds that end-user satisfaction with the client/server system (CSS) positively impacts the frequency and duration of system usage. Lin (2008) also finds user satisfaction to be a strong determinant of virtual community use and sense of belonging. Yuthas and Young (1998) conclude that positive satisfaction and frequent use of the system ultimately affects better decision making and adds value to the firm. As articulated in existing literature, positive evaluations of the smart speaker are anticipated to influence the actual use of the device. Frequent usage of the device is also anticipated to enhance users' decisions to continuously use the current smart speaker device. Thus, the following hypothesis are suggested.

**H4. Consumer's satisfaction with the smart speaker will positively affect the use of the smart speaker.**

**H5. Smart speaker usage will positively affect user's intentions to continuously use the smart speaker.**



## **2.6. Smart Speaker Service Quality**

Quality is a concept derived from the service delivery process and involves the interaction between consumers and the service providers (Zeithaml, Berry, Parasuraman, 1988). Studies on marketing and information management systems emphasize service quality as a critical antecedent to consumer satisfaction and loyalty. A correlative framework is formed whereby positive service quality evaluations lead to consumer satisfaction and satisfaction leads to consumer loyalty (Caruana, 2000; Sivadas & Baker-Prewitt, 2000). DeLone and McLean (1992) propose that service quality of information systems influence frequent usage, satisfaction, and consumer's future decisions toward the firm. Service quality is therefore an important construct as it helps indirectly affects user loyalty which ultimately impacts the success of the firm (Cronin et al., 2000).

Service quality can be approached in various ways. Lehtinen and Lehtinen (1991) suggest that service quality should be evaluated based on the service process and output quality. Similarly, Grönroos (1984) also suggest service output (technical quality), service process (functional quality), and the image of the firm (image quality) as crucial pillars in measuring service quality. DeLone and McLean (1992) dissect service quality into the dimensions of system quality and information quality. Through this dual approach, service quality is anticipated to have impacts on the individual and organizational level.

This study focuses on smart speakers that have the capability to deliver voice intelligent and artificial intelligent services. Smart speakers are perceived as devices bundled with high levels of IT systems that enable quick processes and delivery of consumer requests. This study will therefore examine consumer's perceptions toward the service quality of smart speakers based on DeLone and McLean's (1992) model. The system quality will refer to the smart speaker's system that processes users' requests and information quality will relate to the information output produced by the system.

### **2.6.1. System Quality**

System quality refers to the information processing system and is measured based on users' interactions with the system over time. System quality is critical as it facilitates the delivery of information to users. Many studies have examined characteristics that can measure the quality of the system. Nelson et al. (1996) suggest reliability, flexibility, accessibility, and response time as measures of system quality. DeLone and McLean (2004) propose usability, response time, reliability, flexibility, security, and interactivity, customization as important dimensions

of measure. Sedera and Gable's (2004) comprehensive instrument for system quality imply that ease of use, ease of learning, user requirements, system features, system accuracy, flexibility, sophistication, integration, and customization are key factors to examine system quality. Wixom and Todd (2005) use reliability, flexibility, integration, accessibility, and timeliness as measures of system quality. Gorla, Somers, and Wong (2010) assert that system quality is important as it also influences the quality of information output. In relation to previous studies on system quality, this study adopted variables that were found to have significant effects in measuring system quality. In addition, interactivity variables were also included to fit the context of smart speakers. While there is a lack of complete yet parsimonious set of service quality dimensions, this study builds on previous studies and proposes reliability, flexibility, accessibility, integration, security, interchangeability, and synchronicity as key attributes to evaluating user's satisfaction and use of the smart speaker.

#### **2.6.1.1. Perceived Reliability**

Reliability is considered an important construct when evaluating service quality. The ability to deliver dependable and accurate services is perceived as the most salient factor in determining user satisfaction and the success of the firm. For instance, Wolfenbarger and Gilly (2003) finds that reliability is the most important value in influencing users' satisfaction with online shopping. Nelson et al. (2005) propose reliability as the key attribute in evaluating the success of the system's quality. Lin (2008) also suggests that system reliability is crucial in influencing the satisfaction and success of online virtual communities. The importance of reliability is not surprising as consumers anticipate service providers to have dependable systems operations that process and deliver requested services accurately.

Reliability is important as it implies that the smart speaker will receive and interpret user requests without any failures. Smart speakers operate based on a trigger word that activates the system to respond to user's voice commands. While reliability of a system can be objectively measured by counting the uptime, downtime, or mean time between failures, this study will measure users' perceptions on how they believe the system is reliable in understanding their requests (Nelson et al., 2005). Smart speakers that are technically available at all times are anticipated to enhance users' satisfaction and usage of the smart speaker.

**H6a. Smart speaker's perceived reliability will have a positive effect on smart**

**speaker satisfaction.**

**H6b. Smart speaker's perceived reliability will have a positive effect on smart speaker usage.**

#### **2.6.1.2. Perceived Accessibility**

Accessibility is perceived as a fundamental condition in information systems management. Kandari (2010) describes accessibility as the degree to which the information is easily and quickly extractable to the user. Wixom and Todd (2005) claim that accessibility and reliability have the strongest effects in determining the information management's system quality. In the smart speaker context, accessibility is important as users make requests using their voice. The system is anticipated to interpret the requests of the user and enable users to access information. The system's ability to help users easily access the requested information is an important attribute as it enables users to fulfill their instant needs. The convenience in easily accessing the requested information is anticipated to positively influence user satisfaction and usage. Therefore, the following hypothesis are suggested.

**H7a. Smart speaker's perceived accessibility will have a positive effect on smart speaker satisfaction.**

**H7b. Smart speaker's perceived accessibility will have a positive effect on smart speaker usage.**

#### **2.6.1.3. Perceived Flexibility**

Flexibility is considered an important antecedent to system quality as it measures the degree to which a system can adapt to users' changing needs and conditions. For information systems that are used over time, flexibility has been perceived as a crucial attribute in information systems studies (DeLone & McLean, 1992; Miller & Doyle, 1987). For voice-related systems, flexibility is perceived to be an important attribute as it enables users to easily control and manipulate the time, sequence, and content of the communication with the system (Coyle & Thorson, 2001; McMillan & Hwang, 2002). Flexibility in this study is therefore

understood as the degree to which the system can quickly adapt and address the fickle needs of users that are requested spontaneously.

Smart speakers are generally positioned at an easily accessible place for all family members to use. The speaker's ability to control connected-home devices, provide information and entertainment, and manage one's schedules or contacts attract users to depend on the smart speaker to receive various needs as they arise. The smart speaker's capacity to easily change and adjust to the new voice commands of the user is an important quality to be a successful smart voice assistant. Therefore, the study hypothesizes that the smart speaker's system flexibility is an important antecedent to determining user satisfaction and usage.

**H8a. Smart speaker's perceived flexibility will have a positive effect on smart speaker satisfaction.**

**H8b. Smart speaker's perceived flexibility will have a positive effect on smart speaker usage.**

#### **2.6.1.4. Perceived Integration**

Integration represents the degree to which the system combines data and information from various sources. For companies with various service divisions, the system's ability to effectively extract and combine data is perceived as an important value to users (Ives, Olson, & Baroudi, 1983; Wixom & Todd, 2005). Through the high integrative system, users may benefit from the convenience in receiving various comprehensive information and services.

Based on how smart speakers are dominated by major IT or media firms, smart speaker users are expected to benefit from a wide range of existing services that the service providers provide. For instance, Google Home users can send emails and manage schedules using their Google account, and Korea's Kakao Mini users can send messages and voice calls using Kakao's instant messenger application, KakaoTalk. As service providers partner with third parties, the variety of content and services available through the smart speaker is anticipated to increase significantly. The smart speaker system's ability to extract or combine data from services available on the service provider's platform is expected to fulfill users' wide range of needs which affects users' satisfaction and usage of the smart speaker. Hence,

**H9a. Smart speaker's perceived integration of services will have a positive effect on smart speaker satisfaction.**

**H9b. Smart speaker's perceived integration of services will have a positive effect on smart speaker usage.**

#### **2.6.1.5. Perceived Security**

Perceived security is an important antecedent to the success of various services that deal with consumer's financial data and personal information. Service providers are expected to protect personal information and prevent any manipulation from inappropriate parties (Kolsaker & Payne, 2002). Privacy and security issues have become a significant factor as more users provide their personal information and financial data to the service provider. Flávia and Guinalú (2006) thus assert that service providers are anticipated to ensure integrity, confidentiality, confirmation, and non-recognition of transactions to enhance consumer trust and satisfaction toward the service. In this study, perceived privacy will be the degree to which consumers believe that their personal information will not be viewed, stored, and manipulated by the service provider.

Smart speakers are positioned at users' personal spaces and have access to the service provider's existing services that store user's personal information. The convenience in responding to the wakeup word also comes with the risk of the smart speaker always listening and monitoring user's conversations. Smart speaker providers thus have the responsibility in assuring users that the device has the technical capability to protect users' personal information and financial data. High level of perceived security is thus expected to increase user satisfaction and use of the smart speaker device. Hence,

**H10a. Perceived security of the smart speaker will have a positive effect on smart speaker satisfaction.**

**H10b. Perceived security of the smart speaker will have a positive effect on smart speaker usage.**

#### **2.6.1.6. Perceived Interactivity**

Interactivity is a dimension that has become one of the core antecedents to information systems success after the widespread use of the World Wide Web (DeLone & McLean, 2004; Palmer, 2002). The range of interactivity has expanded from computer-mediated human interaction to media interaction (Stromer-Galley, 2000). Zeithaml, Parasuraman, and Malhotra (2002) assert that interactivity on the online context can represent user's capability of interactively searching for information and conducting transactions on the website. Interactivity is important as constant interaction and knowledge of the user enables the deliver customized services (Palmer, 2002). McMillan and Hwang (2002) suggest that three dimensions that appear frequently in interactivity literature are controllability, responsiveness, and direction of the communication. Yoo, Lee, and Park (2010) also find the three dimensions to be the core of measuring interactivity and find synchronicity and interchangeability as the two key dimensions that influence user perceived value and satisfaction in the online retail context. Based on previous research, this study will interpret interactivity as the system's ability to provide synchronous communication (synchronicity) and the ability to conduct a two-way communication where the system responds with a feedback (interchangeability).

For voice-activated speakers, interactivity is especially important as all commands are initiated and completed through the voice. Users anticipate the smart speaker to synchronously respond to user's requests through feedback that fits the context of the conversation. Purington, Taft, Sannon, and Taylor (2017) conduct a case study of Amazon Alexa users and find that personification and social interaction enable users to enhance satisfaction with the smart speaker. As smart speakers penetrate users' daily lifestyles, the interactivity of the smart speaker is anticipated to enhance user satisfaction and attachment. By completing voice requests and providing entertainment, the smart speaker's interactivity system is expected to increase user satisfaction and usage. The following hypothesis are thus proposed.

**H11a. Smart speaker's perceived synchronicity will have a positive effect on smart speaker satisfaction.**

**H11b. Smart speaker's perceived synchronicity will have a positive effect on smart speaker usage.**

**H12a. Smart speaker's perceived interchangeability will have a positive effect on**

**smart speaker satisfaction.**

**H12b. Smart speaker's perceived interchangeability will have a positive effect on smart speaker usage.**

### **2.6.2. Information Quality**

Information quality is measured based on how users perceive the information or content provided by the service provider. Information quality is anticipated to help complete specific tasks and make decisions that impact the value of the firm (DeLone & McLean, 1992). Among various ways to examine information quality, Wang and Strong (1996) is one of the first to provide a comprehensive overview of examining information quality under the dimensions of intrinsic, contextual, and representational informational quality. First, the intrinsic data quality dimension focuses on the information itself and includes accuracy, objectivity, believability, and reputation attributes. Second, the contextual data quality dimension refers to the promptness of the information and covers relevancy, value-added, timeliness, completeness, and appropriate amount of data attributes. Last, the representational data quality dimension relates to the format and meaning of the information. Kahn, Strong, and Wang (2002) later suggest a model that categorizes the quality of information based on how the information is sound, dependable, useful, and usable by users. DeLone and McLean (2004) suggest accuracy, relevance, understandability, completeness, currency, and content personalization as core dimensions in measuring information quality. Kandari (2010) provides a thorough review of the information quality attributes and suggests understandability, accuracy, believability, navigation, amount of data, completeness, advertising, concise representation, and consistent representation as the core factors in assessing information quality. While there is no clear consensus in evaluating information quality, this study will apply the structure of Wang and Strong (1996) and focus on accuracy (reflecting intrinsic quality), completeness (reflecting contextual quality), and personalization (reflecting representational quality) dimensions.

#### **2.6.2.1. Perceived Accuracy**

Accuracy is perceived as one of the most important and frequently used factors in evaluating information quality (Kandari, 2010). Information that is stored and delivered to the

user is anticipated to be correct, unequivocal, and accurate. Wang and Strong (1996) also include meaningfulness to measure the intrinsic quality of the information. This implies that the information should not only be objective but also meaningful and believable. Fisher and Kingma (2001) also posit the value of providing accurate information consistently. Studies related to use of information management systems and online websites find accuracy as one of the critical factors that influence the success of the system (Nelson et al., 2005; Wixom & Todd, 2005; Muyelle, Moenaert, & Despontin, 2004). This study will therefore interpret accuracy as the degree to which the information is perceived to be correct, unequivocal, consistent, and meaningful. Information obtained from the smart speaker relies on the service provider's search engine. Users expect smart speakers to deliver accurate and consistent information from credible sources. The perceived accuracy and believability of the information is perceived to be an important dimension that enhances users' satisfaction and use of the smart speaker.

**H13a. Perceived accuracy of information will have a positive effect on smart speaker satisfaction.**

**H13b. Perceived accuracy of information will have a positive effect on smart speaker usage.**

#### **2.6.2.2. Perceived Completeness**

Completeness refers to the extent to which the information is sufficient in breadth and in depth to fulfill the requested task. All available information is anticipated to be compactly delivered to the user upon request. Wang and Strong (1996) however claims that completeness is a subjective dimension that can only be determined by the user. While the information may seem sufficient and complete to others, the information may seem incomplete based on the expectations and contextual demands of the user. Completeness is thus perceived as the degree to which the user perceives that all possible information is represented and delivered through the smart speaker. For users that rely on the smart speaker to gain news and essential information, the delivery of news that are concise and complete to the user is necessary. As smart speakers deliver information based on search engines that have numerous sources of information, smart speakers are anticipated to deliver complete information to the users. Positive experiences of receiving sufficient and complete information is hypothesized to



enhance user's satisfaction and usage of the smart speaker. Hence,

**H14a. Perceived completeness of information will have a positive effect on smart speaker satisfaction.**

**H14b. Perceived completeness of information will have a positive effect on smart speaker usage.**

### **2.6.2.3. Perceived Customization**

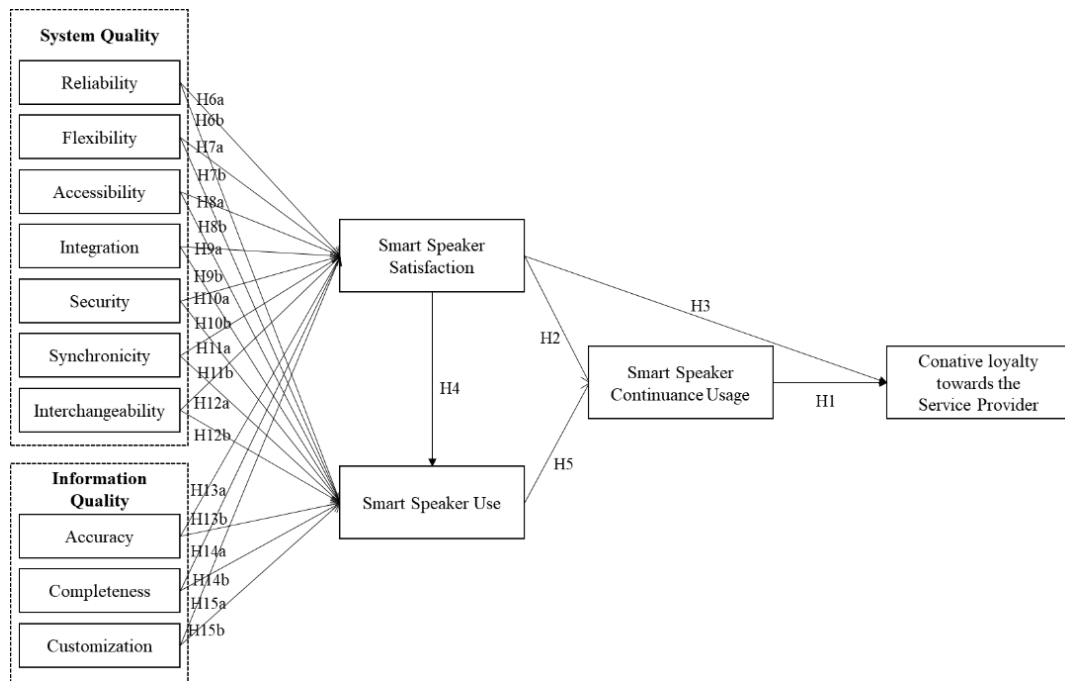
Recent studies focus on how customization is a key element in motivating information service success and consumer relationship management (Coelho & Henseler, 2009; DeLone & McLean, 2004; Molla & Licker, 2001). Customization is defined as the degree to which the information is tailored to meet the preferences of the user. Wang and Strong (1996) emphasize the delivery of information to be easily accessed and understood by the user. Personalized content is anticipated to reduce the level of effort in using the service and provide efficiency in receiving content that fulfills one's preferred needs. Palmer (2002) posits that customization is a key capability that triggers website success.

Smart speakers provide a wide array of services that have significant potential to deliver customized services. As smart speakers integrate services, users are anticipated to receive seamless services that are tailored to the user. For instance, Google Home users will have access to Google email, a personalized music list that the user listens to on YouTube, and a preferred setting for their homes. As smart speakers integrate various services, users may benefit from the delivery of customized services that fit the personalized needs of users. The delivery of customized information is thus anticipated to increase user satisfaction and usage of the smart speaker.

**H15a. Smart speaker's information customization will have a positive effect on smart speaker satisfaction.**

**H15b. Smart speaker's information customization will have a positive effect on smart speaker usage.**

Based on the foregoing hypotheses, Figure 1 presents the research model used in this study.



**Figure 1.** *Research Model*

### 3. Methodology

#### 3.1. Overview

The study employed an online survey as its quantitative approach. The survey was conducted in Korea, which is one of the fastest growing smart speaker markets (Herh, 2018). Korea's smart speaker market is dominated by local telecommunication and IT firms, namely SKT, KT, Naver, and Kakao. Kakao is Korea's leading mobile messenger operator and Naver is the country's biggest portal website operator. Smart speakers from Kakao (Kakao Mini) and Naver (Naver Friends, Friends Mini, Wave) are renowned for having their own search engine and providing various integrated services. For example, Kakao Mini users can search information from Kakao's portal, send messages, listen to music, and reserve online-to-offline services available on the Kakao's messenger application. Naver's smart speaker users can also use the database of the Naver portal, purchase at Naver shopping, and learn English by talking with the smart speaker. Telecommunication service providers distinguish their services by focusing on smart home related services. SKT Nugu and KT Giga Genie speaker users can manage more than 15 electronic devices using the smart speaker while also relishing convenient services such as food delivery, online banking, and shopping. The competition in

Korea's smart speaker market is expected to intensify as foreign firms enter the domestic market. Google recently announced its release of Google Home and Mini to seven new countries, including Korea. By examining how consumers perceive the quality of smart speakers, and how their satisfaction and use of the smart speaker leads to loyalty towards the service provider, this study hopes to understand the current smart speaker market in the consumer's perspective and offer meaningful implications.

### **3.2.Measures**

This study was designed to understand whether satisfaction with the smart speaker leads users to become locked-in to the smart speaker provider. Based on previous literature, satisfaction was measured by examining consumer's perceived service quality. The study used DeLone and McLean's (1992, 2004) approach to examine the smart speaker's system and information quality. Items from previous research were adopted to test the relationship between satisfaction with the smart speaker to attachment to the service provider. An online survey using a seven-point Likert scale ranging from "1=strongly disagree" to "7=strongly agree" was conducted. Questions related to information and systems quality were driven from Nelson et al. (2005), Muelle et al. (2004), and Yoo et al. (2010). A total of 37 questions were asked for the service quality of the smart speaker. Nine questions referring to smart speaker satisfaction, loyalty, and attachment to the service were examined using instruments proposed by Blut et al. (2007) and Zeithaml et al. (1996).

### **3.3.Data Collection**

The data for the survey were collected in corporation Macromill Embrain Co., a professional research firm in Korea. Survey participants were randomly selected and notified via email to participate in the survey. To participate in the study, respondents needed to be smart speaker users. Online questionnaires were distributed to a total of 326 valid participants from May 8 to May 11, 2018. The sample was generally balanced with 59.8 percent ( $n = 195$ ) men. Participants were asked to check all the smart speakers they possess. Kakao Mini (37.7%) was mostly used by the survey participants followed by KT Giga Genie (33.7%), SKT Nugu (31.6%), and Naver Wave or Friends (14.1%). Users also showed possessions of Google Home (7.4%) and Amazon Echo (3.7%). 57.7% of survey participants reported using the smart

speaker more than five days a week. Table 1 summaries the descriptive statistics of respondents.

Demographic variable	Item	Frequency	Percentage
Gender	Male	195	59.8
	Female	131	40.2
	Total	326	100
Age ( <i>M</i> = 40.4)	20–29	60	18.4
	30–39	89	27.3
	40–49	103	31.6
	50 and over	74	22.7
	Total	335	100
Education	Graduate level	51	15.6
	University	212	65.0
	Community college	38	11.7
	High school	25	7.7
	Total	326	100
Active Time spent at Home (Hours)	Less than 4 hours	84	25.8
	4 – 5	87	26.7
	5 – 6	67	20.6
	6 – 7	44	13.5
	More than 7	44	13.5
	Total	326	100
Smart Speaker Usage (Days)	1	22	6.7
	2	27	8.3
	3	60	18.4
	4	29	8.9
	5	54	16.6
	6	18	5.5
	7	116	35.6
	Total	326	100

### 3.4.Data Analysis

The present study used the SPSS 23 software package to manage the collected data. Hypothesis were examined using the PLS-SEM via SmartPLS software. The PLS-SEM model was chosen as this study is an exploratory research that applies various concepts with little available theory (Wong, 2013). The model is also appropriate as it has low sample requirements. Hair, Ringle, and Sarstedt (2011) posit that the PLS analysis can show high significance even when the sample size is relative small with just 100 observations. PLS-SEM model was also chosen as it enables more flexibility in building complex research models that include

formative and reflective variables (Lowry & Gaskin, 2014). Based on the advantages of PLS form of SEM and its explorative use in literature related to marketing (Hair et al., 2011; Yi & Gong, 2009), this study applied PLS analysis as an appropriate measurement tool.

## 4. Results

### 4.1.Measurement Model

The structural model is validated based on the reliability and validity of the latent variables. PLS analysis assesses internal consistency, convergent validity, and discriminant validity to substantiate the structural model. First, internal consistency reliability is measured using Cronbach's alpha and composite reliability (CR). All constructs are anticipated to be higher than 0.7. Table 2 demonstrates that all values of Cronbach's alpha and CR are higher than 0.7. This implies that the model has high levels of internal consistency reliability. Second, convergent validity is proved by assessing the average variance extracted (AVE). AVE represents the correlation of indicators and shows how they fit best under a specific construct. Convergence validity is confirmed when the constructs are greater than 0.5. In Table 2, each construct shows values that exceed 0.5. This finding implies that the items are reliable and that all indicators are closely related to given constructs. Lastly, discriminant validity indicates that the items load highly onto theoretically driven factors (Ryu, Kim, & Kim, 2014). Discriminant validity is provided when the square root of AVE is greater than the correlations among constructs (see Table 3). To further understand convergent and discriminant validity, the item loadings and cross-loading were further analyzed (see Table 4).

**Table 2.** *Reliability and Validity Test Results*

	Cronbach's alpha	CR	AVE	Communality	Redundancy
LOYALTY	0.927	0.954	0.873	0.873	0.438
CONTINUED USAGE	0.927	0.953	0.872	0.872	0.644
SATISFACTION	0.901	0.938	0.835	0.835	0.086
USE	1.00	1.00	1.00	1.00	0.083
SRELIABILITY	0.879	0.925	0.805	0.805	
SFLEXIBILITY	0.921	0.950	0.864	0.864	
SACCESSIBILITY	0.883	0.927	0.810	0.810	

SINTEGRATION	0.868	0.919	0.791	0.791
SSECURITY	0.906	0.941	0.842	0.842
SSYNCHRONICITY	0.880	0.926	0.806	0.806
SINTERCHANGE- ABILITY	0.817	0.891	0.732	0.733
IACCURACY	0.877	0.916	0.732	0.732
ICOMPLETENESS	0.867	0.918	0.790	0.790
ICUSTOMIZATION	0.864	0.917	0.786	0.786

*Note:* S (system quality) and I (information quality) are written in front of each attribute to help understand which quality it represents.

**Table 3.** *Internal Consistency and Correlation Across the Constructs*

	CTD	IACC	ICM	ICU	LOY	SAC	SAT	SFL	SIE	SIX	SRE	SSE	SSY	USE
CTD	<b>0.934</b>													
IACC	0.661	<b>0.855</b>												
ICM	0.576	0.759	<b>0.889</b>											
ICU	0.633	0.790	0.810	<b>0.887</b>										
LOY	0.844	0.723	0.678	0.714	<b>0.934</b>									
SAC	0.650	0.724	0.679	0.696	0.680	<b>0.900</b>								
SAT	0.860	0.721	0.691	0.741	0.864	0.727	<b>0.914</b>							
SFL	0.575	0.710	0.737	0.670	0.642	0.705	0.681	<b>0.929</b>						
SIE	0.644	0.738	0.714	0.743	0.693	0.791	0.727	0.770	<b>0.889</b>					
SIX	0.623	0.731	0.698	0.756	0.638	0.747	0.703	0.669	0.724	<b>0.856</b>				
SRE	0.626	0.689	0.602	0.579	0.633	0.702	0.689	0.738	0.700	0.653	<b>0.897</b>			
SSE	0.359	0.605	0.614	0.586	0.459	0.468	0.501	0.618	0.530	0.523	0.489	<b>0.918</b>		
SSY	0.674	0.719	0.716	0.737	0.716	0.813	0.776	0.676	0.766	0.775	0.675	0.523	<b>0.898</b>	
USE	0.364	0.176	0.184	0.218	0.332	0.233	0.315	0.186	0.211	0.211	0.262	0.101	0.253	<b>1.00</b>

*Note:* CTD = continuous usage; IACC = accuracy; ICM = completeness; ICU = customization; LOY = conative loyalty; SAC = accessibility; SAT = satisfaction; SFL = flexibility; SIE = integration; SIX = interchangeability; SRE = reliability; SSE = security; SSY = synchronicity. Square roots of AVE are indicated in bold. For discriminant validity, bold print digits should be larger than the correlation elements in the same row and column.

**Table 4.** *Item Loadings and Cross-Loadings*

	LOY	CTD	SAT	USE	SRE	SFL	SAC	SIE	SSE	SSY	SIX	IACC	ICM	ICU
LOY1	<b>0.924</b>	0.796	0.835	0.307	0.616	0.623	0.659	0.677	0.459	0.690	0.620	0.707	0.670	0.718
LOY2	<b>0.940</b>	0.776	0.786	0.299	0.593	0.591	0.599	0.630	0.425	0.645	0.585	0.654	0.615	0.647

LOY3	<b>0.939</b>	0.792	0.800	0.325	0.565	0.585	0.646	0.635	0.402	0.672	0.582	0.663	0.613	0.633
CTD1	0.758	<b>0.929</b>	0.787	0.302	0.555	0.496	0.613	0.579	0.317	0.604	0.590	0.597	0.508	0.567
CTD2	0.805	<b>0.953</b>	0.809	0.352	0.615	0.540	0.614	0.615	0.327	0.645	0.592	0.636	0.558	0.605
CTD3	0.799	<b>0.919</b>	0.813	0.365	0.583	0.572	0.594	0.607	0.360	0.639	0.564	0.618	0.547	0.600
SAT1	0.739	0.735	<b>0.890</b>	0.275	0.659	0.671	0.631	0.667	0.464	0.699	0.640	0.655	0.680	0.685
SAT2	0.808	0.825	<b>0.947</b>	0.326	0.641	0.631	0.694	0.684	0.471	0.720	0.654	0.679	0.631	0.678
SAT3	0.821	0.796	<b>0.904</b>	0.261	0.590	0.568	0.667	0.643	0.440	0.708	0.634	0.643	0.587	0.670
USE	0.332	0.364	0.315	<b>1.000</b>	0.262	0.186	0.233	0.211	0.101	0.253	0.211	0.176	0.184	0.218
SRE1	0.531	0.536	0.576	0.256	<b>0.888</b>	0.608	0.599	0.587	0.387	0.577	0.567	0.584	0.518	0.482
SRE2	0.595	0.577	0.664	0.238	<b>0.909</b>	0.693	0.655	0.660	0.475	0.630	0.608	0.646	0.576	0.567
SRE3	0.575	0.573	0.610	0.212	<b>0.895</b>	0.684	0.634	0.633	0.452	0.609	0.580	0.622	0.524	0.506
SFL1	0.585	0.518	0.617	0.167	0.685	<b>0.926</b>	0.632	0.692	0.590	0.605	0.604	0.663	0.667	0.591
SFL2	0.612	0.558	0.666	0.161	0.704	<b>0.942</b>	0.661	0.731	0.558	0.641	0.641	0.654	0.716	0.658
SFL3	0.594	0.525	0.615	0.191	0.670	<b>0.920</b>	0.674	0.725	0.577	0.638	0.621	0.663	0.671	0.617
SAC1	0.635	0.581	0.676	0.231	0.645	0.685	<b>0.896</b>	0.703	0.504	0.716	0.678	0.701	0.651	0.667
SAC2	0.611	0.572	0.642	0.217	0.606	0.625	<b>0.912</b>	0.705	0.385	0.746	0.663	0.629	0.615	0.619
SAC3	0.588	0.602	0.643	0.180	0.644	0.592	<b>0.892</b>	0.729	0.370	0.734	0.675	0.622	0.564	0.591
SIE1	0.641	0.588	0.674	0.225	0.676	0.728	0.726	<b>0.884</b>	0.477	0.720	0.658	0.698	0.669	0.685
SIE2	0.588	0.559	0.647	0.181	0.601	0.659	0.696	<b>0.905</b>	0.468	0.662	0.640	0.626	0.626	0.676
SIE3	0.619	0.569	0.615	0.153	0.586	0.665	0.686	<b>0.878</b>	0.467	0.660	0.631	0.640	0.605	0.618
SSE1	0.412	0.324	0.459	0.070	0.454	0.584	0.445	0.518	<b>0.940</b>	0.476	0.491	0.597	0.566	0.545
SSE2	0.475	0.380	0.507	0.129	0.499	0.586	0.456	0.517	<b>0.948</b>	0.503	0.535	0.613	0.591	0.572
SSE3	0.369	0.273	0.407	0.074	0.385	0.530	0.383	0.416	<b>0.863</b>	0.460	0.402	0.442	0.530	0.491
SSY1	0.652	0.623	0.712	0.249	0.622	0.624	0.788	0.737	0.485	<b>0.902</b>	0.706	0.687	0.647	0.680
SSY2	0.607	0.588	0.688	0.205	0.579	0.555	0.681	0.646	0.439	<b>0.904</b>	0.697	0.606	0.602	0.637
SSY3	0.670	0.605	0.689	0.226	0.617	0.640	0.719	0.679	0.484	<b>0.889</b>	0.686	0.641	0.681	0.666
SIX1	0.591	0.555	0.641	0.185	0.601	0.664	0.664	0.706	0.463	0.743	<b>0.839</b>	0.598	0.647	0.660
SIX2	0.501	0.532	0.563	0.171	0.532	0.441	0.646	0.533	0.367	0.610	<b>0.841</b>	0.616	0.514	0.587
SIX3	0.540	0.511	0.596	0.184	0.537	0.599	0.604	0.606	0.506	0.628	<b>0.887</b>	0.663	0.623	0.687
IACC1	0.636	0.607	0.613	0.145	0.626	0.582	0.634	0.619	0.481	0.602	0.621	<b>0.889</b>	0.631	0.651
IACC2	0.633	0.600	0.632	0.163	0.603	0.581	0.647	0.623	0.498	0.617	0.661	<b>0.883</b>	0.607	0.665
IACC3	0.633	0.599	0.648	0.181	0.635	0.677	0.685	0.694	0.503	0.679	0.689	<b>0.866</b>	0.699	0.748
IACC4	0.568	0.445	0.570	0.108	0.484	0.587	0.500	0.584	0.599	0.554	0.520	<b>0.780</b>	0.662	0.635
ICM1	0.617	0.499	0.609	0.177	0.537	0.666	0.602	0.617	0.582	0.652	0.602	0.714	<b>0.901</b>	0.714
ICM2	0.546	0.458	0.549	0.126	0.485	0.553	0.559	0.594	0.490	0.568	0.587	0.600	<b>0.850</b>	0.668
ICM3	0.638	0.570	0.676	0.183	0.577	0.731	0.644	0.686	0.560	0.682	0.668	0.703	<b>0.914</b>	0.772
ICU1	0.663	0.595	0.674	0.223	0.557	0.639	0.634	0.684	0.507	0.676	0.667	0.700	0.778	<b>0.890</b>
ICU2	0.591	0.524	0.603	0.165	0.434	0.517	0.527	0.588	0.524	0.578	0.646	0.671	0.643	<b>0.860</b>
ICU3	0.642	0.562	0.689	0.188	0.541	0.618	0.681	0.698	0.530	0.697	0.696	0.729	0.727	<b>0.909</b>

Note: Cross-loadings are indicated in bold. For discriminant and convergent validity, cross-loadings must be above 0.7 and larger than the other loading elements in the same column and row.

#### 4.2.PLS-SEM Path Analysis

Fifteen hypotheses were tested to see how satisfaction with the smart speaker leads to continuous usage intentions and conative loyalty toward the smart speaker service provider. A

boot strapping procedure was conducted to verify the precision of the path coefficients produced from the PLS analysis. Particularly, R-square statistics on each dependent variable was examined to check the weight relations and the substantive effect derived from connected latent variables (Chin, 2010). The research model explains 78.6 percent of variance in conative loyalty toward the service provider. Smart speaker use has a R-square value of 12.2 percent and satisfaction with smart speakers has a 70.6 percent variance. Consumer's intention to continuously use the smart speaker has 75 percent of variance. Figure 2 summarizes the results.

The study supports the relationship between smart speaker satisfaction and conative loyalty towards the smart speaker service provider. Satisfaction also affects smart speaker usage and continuous usage intentions. The study first hypothesized that smart speaker continuance usage will lead to conative loyalty toward the smart speaker service provider (H1). The results were consistent with the hypothesis and indicated that intention to continuously use the smart speaker has a positive relationship with attachment toward the service provider ( $\beta = 0.386, p < 0.001$ ). The study findings imply that consumer's intention to continuously use the smart speaker is positively influenced by the actual usage of the smart speaker (H5,  $\beta = 0.103, p < 0.001$ ) and user's level of satisfaction (H2,  $\beta = 0.828, p < 0.001$ ). User satisfaction was perceived to be an important value as it influences the actual use of the smart speaker (H4,  $\beta = 0.309, p < 0.01$ ). Most importantly, the research results showed a positive relationship between smart speaker satisfaction and conative loyalty (H3). The study findings imply that satisfaction with the smart speaker can spill over to influence user's loyalty and attachment toward the smart speaker service provider ( $\beta = 0.532, p < 0.001$ ). The data was therefore consistent with H1, H2, H3, H4, and H5.

Existing literature imply that satisfaction is determined by positive quality experiences of the service or product. To identify the factors that affect user satisfaction, the study adopted constructs from information and systems management to the smart speaker context. Satisfaction and use of the smart speaker was hypothesized to be influenced by the systems quality (H6, H7, H8, H9, H10, H11, H12) and information quality (H13, H14, H15) of the smart speaker. Perceived reliability (H6), flexibility (H7), accessibility (H8), integration (H9), security (H10), synchronicity (H11), and interchangeability (H12) were applied to examine the system quality of the smart speaker. Among the seven attributes, only perceived reliability (H6a,  $\beta = 0.183, p < 0.01$ ) and perceived synchronicity (H11a,  $\beta = 0.306, p < 0.001$ ) were statistically significant in positively influencing smart speaker satisfaction. There was insufficient statistical significance between smart speaker use and the seven system quality attributes.



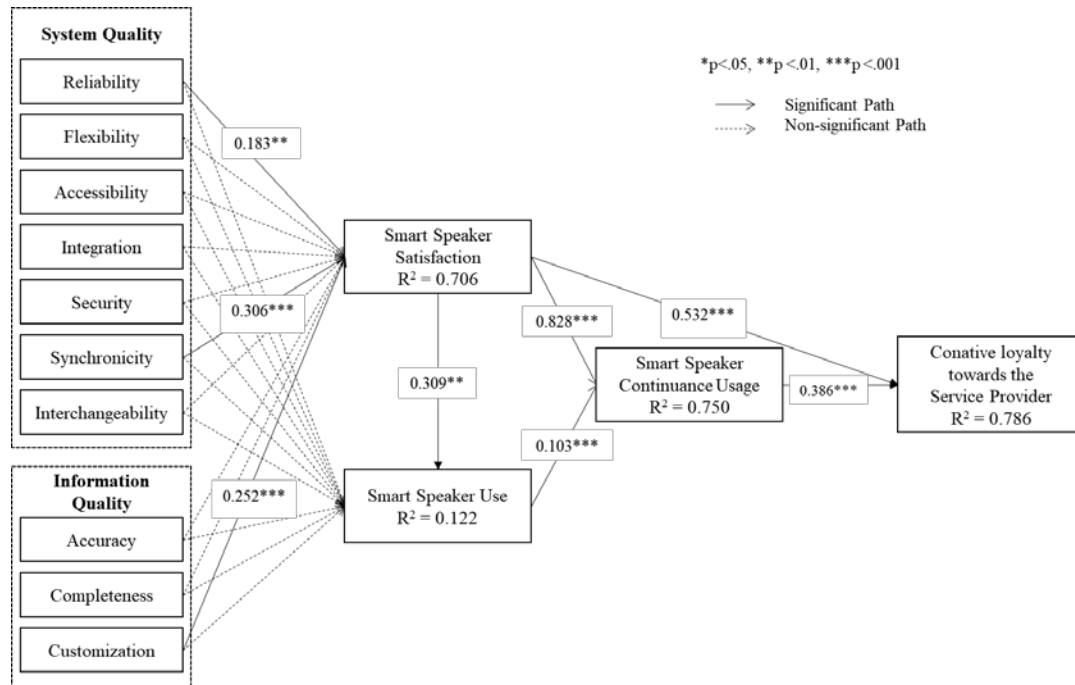
Hence, only H6a and H11a were significant in the system quality dimension.

Information quality was analyzed using perceived accuracy (H13), completeness (H14), and customization (H15) as the core attributes of measure. Perceived customization (H15a) showed a positive relationship with smart speaker satisfaction ( $\beta = 0.252, p < 0.001$ ) but had no statistical significance in smart speaker usage (H15b). Perceived accuracy (H13a and H13b) and completeness (H14a and H14b) showed insufficient statistical significance in affecting smart speaker satisfaction and use. Table 5 and Figure 2 summarize the hypotheses, coefficients, and *t*-values.

**Table 5.** Hypothesis Test Results

Hypothesis	Relation	Coefficient	<i>t</i> -value	Result
H1	Continuance Usage → Conative Loyalty	0.386	6.265	<b>Accepted</b>
H2	Satisfaction → Continuance Usage	0.828	43.672	<b>Accepted</b>
H3	Satisfaction → Conative Loyalty	0.532	8.970	<b>Accepted</b>
H4	Satisfaction → Continuance Usage	0.309	2.876	<b>Accepted</b>
H5	Speaker Use → Speaker Use	0.103	3.571	<b>Accepted</b>
H6a	Perceived Reliability → Satisfaction	0.183	3.006	<b>Accepted</b>
H6b	Perceived Reliability → Speaker Use	0.185	1.937	Rejected
H7a	Perceived Flexibility → Satisfaction	0.057	0.835	Rejected
H7b	Perceived Flexibility → Speaker Use	0.066	0.642	Rejected
H8a	Perceived Accessibility → Satisfaction	0.049	0.775	Rejected
H8b	Perceived Accessibility → Speaker Use	0.021	0.187	Rejected
H9a	Perceived Integration → Satisfaction	0.047	0.691	Rejected
H9b	Perceived Integration → Smart Speaker Use	0.044	0.397	Rejected
H10a	Perceived Security → Satisfaction	0.032	0.703	Rejected
H10b	Perceived Security → Speaker Use	0.053	0.729	Rejected
H11a	Perceived Synchronicity → Satisfaction	0.306	4.589	<b>Accepted</b>
H11b	Perceived Synchronicity → Speaker Use	0.053	0.449	Rejected
H12a	Perceived Interchangeability → Satisfaction	0.002	0.030	Rejected
H12b	Perceived Interchangeability → Speaker Use	0.019	0.190	Rejected
H13a	Perceived Accuracy → Satisfaction	0.075	1.080	Rejected
H13b	Perceived Accuracy → Smart Speaker Use	0.161	1.508	Rejected
H14a	Perceived Completeness → Satisfaction	0.009	0.166	Rejected
H14b	Perceived Completeness → Speaker Use	0.022	0.228	Rejected

H15a	Perceived Customization → Satisfaction	0.252	3.711	<b>Accepted</b>
H15b	Perceived Customization → Speaker Use	0.095	0.778	Rejected



**Figure 2.** Research Model and Results

## 5. Conclusion and Discussion

### 5.1. Conclusion

The smart speaker market is dominated by IT, telecommunication, and media firms that have no prior experiences in producing audio devices. Using the firm's existing services, smart speakers are perceived as a new opportunity to attract and retain users. In addition, by using user's voice to fulfill various needs, smart speakers are perceived as a new gateway to enter user's homes and become the next big thing that permeate users' lives. The current study focused on this trend and examined whether smart speaker satisfaction influences user's intentions to continue using the smart speaker and ultimately become conatively loyal to the smart speaker provider. The study implemented a quantitative research by conducting an online survey to Korea's smart speaker users. The presented PLS analysis supported the relationship between smart speaker satisfaction and loyalty toward the service provider. Consumers satisfied with smart speakers were shown to continuously use the service and show conative loyalty by remaining attached to the smart speaker provider. Frequent use of the smart speaker

was also shown to positively influence intentions to continuously use the smart speaker and ultimately influence conative loyalty toward the smart speaker provider.

In line with previous research that perceives service quality as an important antecedent to satisfaction and loyalty, this study applied key dimensions from information systems literature to the context of the smart speaker. Among seven system quality attributes and three information quality attributes, only perceived reliability, synchronicity, and customization were shown to have a significant influence on user satisfaction. All ten attributes showed no statistical significance in determining the use of the smart speaker.

This study is meaningful as it sheds light on IT and media firm's race to enter the smart speaker market and "lock-in" users to their service platform. While news reports highlight the market potential of the smart speaker, this study aimed to understand consumer's perceptions toward the smart speaker and their conative loyalty to the smart speaker provider. The study shows that consumer satisfaction is an important asset that influences intentions to continuously use the smart speaker and become conatively loyal to the smart speaker provider. Findings from this study provide a general overview of how consumers perceive the quality of smart speakers available in the Korean market. The study encourages service providers to continuously enhance consumer satisfaction and smart speaker usage to gain competitive advantage in successfully locking-in users to the service provider's platform.

## **5.2.Implications**

The findings of this study imply that consumer satisfaction is an important asset to the firm as it leads to not only continuous usage of the smart speaker but also loyalty to the service provider. Satisfied users are shown to remain attached to the service provider by having positive attitudes toward the service provider, increasing the use of other available services, and preferring the firm's service over others. Firms are therefore encouraged to consider ways to strategically enhance consumer satisfaction as it provides service providers more opportunities to lock-in users to their service platform.

The study proposes that system reliability, interaction synchronicity, and customized information delivery are key attributes in influencing smart speaker satisfaction. This implies that users value the importance of system security and the system's ability to enable quick feedback. The delivery of customized information based on data storage and the ability to select the language of the speaker also appear to be an important attribute in enhancing customer satisfaction. However, the study implies that smart speakers that are currently available in the

Korean market lack various abilities to ensure user satisfaction. Among system quality constructs, even though smart speakers are referred as voice-activated intelligent speakers that fulfill users' instant requests, the study findings imply that Korean users do not perceive smart speakers as flexible in adapting to their needs. Perceived flexibility of the service could be improved by reducing the time lapse in adjusting to different orders and enhancing the ability to listen and capture requests more carefully. Second, users showed lack of certainty about the system's ability to integrate various services that are already provided by the service provider. While news reports claim the integration of various services to increase the convenience of users, smart speakers appear to have insufficient functions in reaching consumers' expectations. Limited services of Google and Amazon Prime services in Korea may also influence this lack of perceived system integration. Service providers are thus encouraged to integrate existing services and increase the delivery of customized services tailored to the user. Third, users showed less assurance of smart speakers in their ability to protect user's personal information and financial data. As smart speakers become the new gateway to users' homes and private spaces, trust in the system's security is crucial. Ways to reduce concerns over the service provider's personal information misuse will be important. Service providers may apply more communicative methods in informing the system's data storage process and encourage consumers to have more control over their information exposure through improvements in system settings. Last, even though smart speakers are used to enhance English speaking skills and kill time, the study suggests that smart speakers still lack the ability to exchange conversations. With only synchronicity having an impact on user satisfaction, this implies that users value not only the speed of response but the quality of the interaction. Further ways to increase speaker's interactivity is advised.

For information quality, users showed less certainty about accuracy and completeness of the smart speaker's information delivery. First, perceived accuracy of the smart speaker can be improved by enabling the smart speaker to capture user's voices more accurately. Delivery of correct information can also be assured by considering ways to better communicate the source of the information. Service providers can consider ways to deliver the information source and consistent updates via users' email or messenger services. Second, user's perception of information completeness can be improved by considering ways to deliver the information in a compact way. This could be made through internal service development or through partnerships with various podcast service providers. Besides these suggestions, cooperative efforts in enhancing the quality of the smart speaker will be essential as the race to lock-in users

become competitive. Smart speaker providers are therefore encouraged to consistently examine their services by carefully adhering to the needs of users. Successful delivery of services is anticipated to competitively lock-in users and enable service providers to obtain competitive advantage over other service providers.

### **5.3.Limitations**

The study has its limitations, which suggest avenues for further research. First, concrete dimensions on service quality of the smart speakers can be developed. The current study builds on dimensions that have been widely discussed in the information systems management literature. However, to fully evaluate the quality of smart speakers, a comprehensive effort in developing and creating dimensions of measure is needed. Future studies may include specific constructs that measure services delivered by the smart speaker.

Second, this study focused on users' future intentions to remain loyal to the service provider. Future studies can examine whether smart speaker users have reached the inertia stage of the smart speakers. Intentions to remain attached or reasons behind service transfer can also be researched. Along with the above proposals, continuous research on consumer attitudes toward smart speakers and its service providers are necessary as IT and media firms extend their businesses to survive in the competitive market.

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